WHAT IS CLAIMED IS:

CLAIMS

1. A fracture fixation system for fixation of a first bone fragment and a second bone fragment of a bone fracture, said fixation system comprising a buttressing element, having a first part for fixation to a surface of a first bone fragment, and a second part for insertion within an intramedullary canal of a second bone fragment, said second part having a tip end shaped with a broad contact surface serving a means for abutment against an endosteal surface at an end of the second bone fragment for maintaining length of the second bone fragment relative to the first bone fragment for preventing axial collapse or shortening of the second bone fragment.

2. The fracture fixation system of claim 1, wherein said tip end of said second part is shaped to also maintain transverse and angular position of the second bone fragment.

3. The fracture fixation system of claim 1, comprising bone screws for securing said first part to the first bone fragment.

4. The fracture fixation system of claim 1, wherein said first and second parts form a continuous implant.

5. The fracture fixation system of claim 1, wherein said second part is connected to said first part by a screw engaged in a threaded hole.

6. The fracture fixation system of claim 1, wherein said second part is connected to said first part by a slidable connection and is secured by a screw that threads into said second part.

7. The fracture fixation system of claim 1, wherein said second part is connected to said first part by a morse taper.

8. The fracture fixation system of claim 1, wherein said first and second parts are joined by a tongue and groove connection.

9. The fracture fixation system of claim 8, wherein said tongue and groove connection is secured by a screw.

10. The fracture fixation system of claim 1, wherein said second part has a blunt end to prevent penetration and perforation through a subchondral bone of the second fragment.

11. The fracture fixation system of claim 1, wherein said tip end of the second part is symmetrical or asymmetrical for conforming to a shape of an apical corner of a subchondral bone at said endosteal surface.

12. The fracture fixation system of claim 1, comprising one or more crossing fasteners for securing said second part to said second bone fragment.

13. The fracture fixation system of claim 12, in which two or more of said crossing fasteners are positioned along different planes.

14. The fracture fixation system of claim 13, in which a first said crossing fastener is directed dorsally, a second is directed volarly and a third is inclined toward said first part.

15. The fracture fixation system of claim 1, wherein the bone fracture is of the radius, and said tip end of said second part is contoured with an ogival or bullet shape for conforming to a pointed, apical geometry of a subchondral bone inside a tip of a radial styloid of the second bone fragment.

16. The fracture fixation system of claim 1, wherein said second part is cannulated to allow placement over a guide wire.

17. The fracture fixation system of claim 1, wherein the bone fracture is of the radius, and said second part has internal crossing holes to allow passage of crossing fasteners for securing the second part to the second bone fragment.

18. The fracture fixation system of claim 17, wherein said crossing holes are smooth or threaded and the crossing fasteners are correspondingly smooth or threaded.

19. The fracture fixation system of claim 12, wherein one or more of said crossing fasteners are adapted for being adjustably secured in said second part.

20. The fracture fixation system of claim 12, comprising an expandable slotted bearing receiving one of said crossing fasteners to permit angular adjustment of said one of said crossing fasteners and thereafter being expanded to lock said one of said crossing fasteners in a selected angular position.

21. The fracture fixation system of claim 18, wherein said crossing holes are relatively angulated with respect to one another to receive a range of insertion angles of said crossing fasteners.

22. The fracture fixation system of claim 21, comprising an external guiding arm attachable to said first part, to guide placement of the crossing fasteners in the crossing holes.

23. The fracture fixation system of claim 22, in which the crossing holes position the crossing fasteners at different angles relative to each other.

24. The fracture fixation system of claim 17, wherein said crossing fasteners have heads for compressing external bone of said distal fragment against said second part.

25. The fracture fixation system of claim 24, comprising washers beneath the heads of the fasteners.

26. The fracture fixation system of claim 25, wherein two adjacent washers are integrated into a common plate.

27. The fracture fixation system of claim 17, in which said second part has an external thread for engagement in said second bone fragment.

28. The fracture fixation system of claim 17, wherein said second part is secured in extension with said first part.

29. The fracture fixation system of claim 17, wherein said first part is torsionally rotatable with respect to said second part for selectively fixing the first part to a volar or dorsal surface of the bone.

30. The fracture fixation system of claim 12, wherein one of said crossing fasteners has a threaded portion for threadably engaging in a hole in said second part and a smooth tapered portion extending from said threaded portion to a leading end thereof.

31. The fracture fixation system of claim 12, wherein at least one of said crossing fasteners has a head for compressing external bone of the second fragment against said second part, said at least one of said crossing fasteners being threadably engageable in said second part and including a smooth, unthreaded portion beneath said head to prevent overtightening of said at least one crossing fastener in the second part.

32. The fracture fixation system of claim 12, comprising a washer engaged beneath a head of at least one of said crossing fasteners.

33. An implant for fracture fixation comprising:

a buttressing element including an external portion and an internal portion, said external portion being shaped to be externally engaged on and secured to a stable bone fragment on one side of a bone fracture, said internal portion being sized and shaped for being inserted and accommodated in an intramedullary canal of an unstable bone fragment on an opposite side of the fracture, said internal portion having an end of tapered shape with a rounded tip for fitting in an apical space at an endosteal surface of the unstable bone fragment for bearing against the unstable bone fragment from within to buttress said unstable bone fragment over a large area.

34. The implant of claim 33, wherein said tip of the distal end is adapted to correspond to a shape of the apical space.

35. The implant of claim 33, wherein said rounded tip of the distal end has a bullet-like shape.

36. An implant for fixation of a fracture of the radius, said implant comprising a body including a proximal portion adapted for connection to a stable bone fragment and a distal portion for buttressing a radial styloid of an unstable bone fragment of the fracture, said distal portion being shaped for insertion into an intramedullary canal of the unstable bone fragment for contact with an endosteal surface of the radial styloid for providing a broad buttress support for the radial styloid at the endosteal surface.

37. The implant of claim 36, wherein said distal portion has a blunt shaped end.

38. The implant of claim 37, wherein said blunt shaped end is of rounded bullet-like shape.

39. The implant of claim 38, wherein said blunt shaped end of rounded, bullet-like shape is adapted for congruency with the shape of the endosteal surface at a tip of the radial styloid.

40. The implant of claim 36, wherein said proximal portion includes a flat part adapted for connection to the stable bone fragment.

41. The implant of claim 40, wherein said proximal portion is adapted to be situated along a radial side of the bone.

42. The implant of claim 40, wherein said proximal portion is adapted to be situated along a volar or dorsal side of the bone.

43. The implant of claim 40, wherein said first part is torsionally rotatable with respect to said second part for selectively fixing the second part to a volar or dorsal surface of the bone.

44. The implant of claim 36, wherein said distal and proximal portions are separate

parts joined together.

45. The implant of claim 44, wherein said distal and proximal portions are joined together by at least one screw.

46. The implant of claim 44, wherein said distal and proximal portions are joined by a tongue in groove connection.

47. The implant of claim 44, wherein said distal and proximal portions are connected by a press fit.

48. The implant of claim 36, comprising crossing fasteners adapted for passage through the radial styloid to engage said distal portion crosswise.

49. The implant of claim 48, in which one of the crossing fasteners is angled with a proximal inclination.

50. The implant of claim 48, in which one of the crossing fasteners is angled dorsally or volarly.

51. The implant of claim 36, wherein said distal portion has a broad shaped end for supporting the radial styloid from within the intramedullary canal thereof and for buttressing the radial styloid axially of the distal portion to maintain position and length of the unstable

bone fragment.

52. The implant of claim 36, in which a tip of the distal portion is shaped to maintain radial length by suspending a corner of the radial styloid against said tip which is axially loaded.

53. An intramedullary buttressing member comprising an elongated element including a first portion of flattened shape adapted for mounting on a bone fragment on one side of a bone fracture and a second portion smoothly merging with and extending from said first portion, said second portion having a rounded shape adapted for passage in an intramedullary canal in a bone fragment on an opposite side of the fracture, said second portion being formed with a tip end of rounded, bullet-like shape providing a broad buttressing surface.

54. The intramedullary buttressing member of claim 53, wherein said tip end of bullet-like shape has a configuration to enable said tip end to enter an apical space at an endosteal surface of the bone fragment on the opposite side of the bone fracture.

55. The intramedullary buttressing member of claim 54, wherein said second portion widens and increases in thickness as it extends from said first portion and provides a rounded elongated cross-section which smoothly merges with said tip end of bullet-like shape.

56. The intramedullary buttressing member of claim 55, wherein said first and

second portions merge in a region at which the intramedullary buttressing member is adapted to pass through bone cortex so that said first portion is able to be mounted superficially on said bone fragment on said one side of the fracture while said second portion is able to enter the intramedullary canal of the bone fragment on the opposite side of the fracture..

57. A method for fixation of distal and proximal fragments of a fracture of the radius, said method comprising the steps of:

providing first and second integral parts of an implant for fracture fixation of the radius;

said first and second parts being adapted for respectively engaging proximal and distal fragments of the radius.;

inserting the second part of the implant into an intramedullary canal of the distal fragment and into the radial styloid of the distal bone fragment;

providing a blunt shaped end on said second part for broadly engaging and buttressing an endosteal surface of the radial styloid; and

fixing the first part of the implant to the proximal bone fragment.

58. The method of claim 57, wherein said first and second parts of the implant are formed as one piece.

59. The method of claim 57, wherein said first and second parts of the implant are threadably secured.

60. The method of claim 57, comprising pressing the distal fragment against the tip of the second part and securing crossing fasteners into the distal fragment and said second part.

61. The method of claim 57, comprising inserting crosswise fasteners through the distal bone fragment into the second part of the implant in proximity to said blunt shaped end.

62. The method of claim 57, wherein said crosswise fasteners are inserted at different angles in said bone fragment and said second part of the implant.

63. The method of claim 61, comprising applying compression force on the second bone fragment by said crosswise fasteners.

64. The method of claim 57, comprising forming a groove in said proximal bone fragment in which said first part of the implant is secured.

65. The method of claim 57, wherein said blunt shaped end of said second part is formed with an ogival or bullet shape in conformance with an apical space at the endosteal surface of the subchondral bone inside the radial styloid, and wherein the second part applies axial pressure against said endosteal surface when the first part is secured to the proximal bone fragment.